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XLV.—*On the Specimens of the Genus Cutiterebra and its Allies (Family Œstridæ) in the Collection of the British Museum, with Descriptions of a new Genus and Three new Species.* By E. E. AUSTEN, Zoological Department, British Museum.

[Plate XIII.]

THE genus *Cutiterebra** was founded by Bracy Clark in the year 1815 (Clark, 'An Essay on the Bots of Horses and other Animals,' London, 1815, p. 70) for a group of Œstridæ which is confined to the Nearctic and Neotropical Regions, where the larvæ are parasitic in the subcutaneous tissues of Rodents and Marsupials. The flies themselves, which are characterized by a large stout body, feathered arista, brown wings, and broad flat tarsi, include some of the largest of all Diptera, but are by no means frequently found in collections, although the larvæ of certain species must be exceedingly common in the districts in which they occur. Since the publication of Prof. Brauer's epoch-making work on the Œstridæ ('Monographie der Oestriden,' Wien, 1863), more than thirty years ago, which includes seventeen species of *Cutiterebra*, two of which are apparently synonyms, only one additional species of the genus (*C. approximata*, Walk.) has been described. The present revision proves that the British Museum possesses specimens of nine species of *Cutiterebra*, two of which are new. In 1887 the "division" (Abtheilung) CUTEREBRIDÆ (Brauer,

* Clark wrote *Cuterebra*: the obviously correct form given by Scudder ('Supplemental List of Genera,' p. 93), on the suggestion of Verrall, is here adopted.

Wien. ent. Z., vi. Jahrg., 1887, pp. 5, 11, and 13) (which it would surely be better to call the subfamily CUTITEREBRINÆ) was instituted by Prof. Brauer for *Cutiterebra* and the allied genera *Rogenhoferia* and *Dermatobia*. I now find it necessary to introduce a fourth genus, allied to *Rogenhoferia*, for an interesting new species from the 'Mexican shore of the Gulf of California.

I am aware that, as a result of the recent labours of Brauer and von Bergenstamm, the family Cestridæ is abolished, and its constituent genera form a "section" of the Muscidæ ("Muscaria Schizometopa," Brauer and v. Berg.). For the sake of convenience, however, I have decided to retain the old terminology in the title of the present contribution.

Cutiterebra funebris, sp. n. (Pl. XIII. figs. 1-1 b.)

Cuterebra atrox, Clark (?), 'Essay: Addenda' (1848); description translated by Brauer, 'Monographie der Oestriden,' pp. 241-242 (1863).

The type of this species is a male specimen from Trinidad, forwarded for identification by Mr. J. H. Hart, of the Trinidad Botanical Department. The larva is known in the island as the "Mosquito Worm," and the present specimen, which is accompanied by its pupa-case, was bred from a spiny rat (*Loncheres guianæ*, Thos.). Mr. Hart's statement on the subject will be found below. This species is apparently closely allied to *C. atrox*, Clk., with which after all it may prove to be identical. Unfortunately, owing to the fact that the typical specimen was sent home in a mixture of spirit and glycerine, many of the characters, such as pollinose markings, have been destroyed, while, on the other hand, in spite of many attempts, I have not succeeded in obtaining access to Clark's original description of *C. atrox*, which is accompanied by a figure: I have therefore been forced to content myself with Brauer's translation. On the whole, however, it seemed better to describe the present specimen as new, especially as the type of Clark's species was obtained from Mexico. Since writing the appended description I have discovered that the type of *C. atrox* is in the Oxford Museum, and by the kindness of Prof. Poulton I hope before long to have an opportunity of comparing it.

♂. Dimensions agreeing very well with those given by Brauer for *C. atrox*, taken from Clark's figure: length 24 millim. (25 millim., Brauer); length of wing 20 millim. (as in Brauer); width of vertex 4 millim.; width of head $9\frac{1}{2}$ millim.; width of thorax at base of wings $9\frac{2}{3}$ millim.; width of abdomen at base of third segment $11\frac{2}{3}$ millim.

Black; reddish brown on pectus, pleuræ, sides and posterior angles of dorsum of thorax, base of scutellum, and sides of

abdomen below; abdomen metallic greenish black, shining, dull reddish brown on sides of segments below; wings dark brown, lighter at the base in front; alulae blackish brown.

Front dull, with a deep depression in the median line, possibly due to immaturity; ocellar triangle large, shining black; the depressed area of front reddish brown, doubtless originally pollinose; an impressed pollinose mark running from the eye on each side to the fissura frontalis opposite the base of the antennae; below this, and separated from it by a subquadrate shining black spot, a large dull reddish-brown area, extending from the eye to the fissura frontalis and also running upwards so as to join the extremity of the former mark; this area would doubtless likewise be pollinose in a well-preserved specimen; a round subconical shining black tubercle on each cheek below the eye; entire head thinly clothed with short black pile. *Antennae*: first two joints black, with black pile; third joint short, about as long as the first two joints taken together, reddish brown, apparently pollinose; arista black, thick at the base. Antennary pit broad, septum not developed. *Thorax* and scutellum dull dark brown above; the beginnings of two narrow shimmering silvery stripes in front of the dorsum, not reaching to the suture, which is very deep; a dull dark brown broader stripe outside these and reaching to the suture, and a similar median one scarcely reaching the suture, faintly indicated; thorax and scutellum entirely clothed with short black pile, which is sparse above, but thicker and longer on the pleurae and along a line bordering the dorsum. *Abdomen* also thinly clothed with short black pile and punctuate; fifth segment more thickly clothed with hair and showing no blue above; apparently it was originally more or less covered with greyish pollen; the reddish area on the sides of the segments below was doubtless also covered with pollen; there are indications that the margins of the second, third, and fourth segments were narrowly white. *Legs* black and clothed with black pile; tibiae with a very prominent fringe of bristly hairs on the outside, making them look very broad; there is a faint indication that they were originally pollinose at the base; all the tarsi extremely broad, the second joint of the second pair measuring $1\frac{1}{2}$ millim. in breadth, the posterior pair even broader.

Trinidad (*Hart*); one specimen.

Pupa-case: length 30 millim.; breadth across the ridge on the sixth segment $17\frac{1}{2}$ millim.; the transverse ridges very strongly developed; entirely clothed with imbricated scales, of which those on the anterior portion of the segments, on the dorsal surface at any rate, are denticulate.

Mr. Hart writes as follows :—

“Royal Botanic Gardens,
Trinidad,
Dec. 11, 1894.

“I take the liberty to forward you a circular issued by my office on the so-called ‘Mosquito Worm.’ This insect has been commonly attributed to *Tipula* as its originator in Trinidad, which of course, without experiment or argument, could be shown to be erroneous. Still the actual rearing of the imago was needed to show on the spot that it was so. This has now been done, as described by circular.” . . .

The following is the circular referred to :—

“Botanical Department, Trinidad.
Circular-note No. 14.

“On Saturday, the 13th of October, I had brought to me a specimen of the Spiny Rat (*Loncheres guianæ*), which had been found feeding on a fruit-tree in the Royal Botanic Gardens.

“On examination the animal was found to be affected with the parasite known in Trinidad as the ‘Mosquito Worm,’ whose life-history up to the present has been but imperfectly known.

“The Rat was placed in a finely netted cage, and on Oct. 22nd, or nine days after it was captured, the animal rid itself of the parasite, and the latter assumed the chrysalis stage in one of the cage corners.

“The chrysalis was a hard body, almost black, with nine [eleven] segments, and in form slightly tapered to opposite ends. It was over one inch and a quarter in length, and measured five eighths of an inch in diameter at its broadest part.

“The chrysalis was kept in damp earth, and on Dec. 3rd (42 days) the perfect insect emerged. . . .

“The puncture in the skin of the Rat on which the fly was developed healed in two or three days.

“The term ‘Mosquito Worm’ is therefore proved to be erroneously applied.

(Signed) “J. H. HART, F.L.S.”

“Dec. 3rd, 1894.”

Cutiterebra approximata, Walk.

Cuterebra approximata, Walker, ‘The Naturalist in Vancouver Island and British Columbia,’ by J. K. Lord, vol. ii. pp. 338–339 (1866).

This, with *C. terrisona*, Walk., *C. funebris*, Austen, and

C. atrox, Clark, belongs to a group of black or blue-black species, which are clothed with black hair, either entirely or with the exception of a tuft of yellow pile on the pleuræ. Much more material is necessary before the limits of these species can be determined satisfactorily.

Judging from the descriptions (Brauer's translation in the case of that of *C. atrox*, Clk.), *C. approximata*, Walk., and *C. atrox*, Clk., are very closely allied. If the dimensions of the latter as given by Brauer ('Monographie,' &c. p. 242) on the basis of Clark's figure are to be depended upon, however, *C. approximata* is a smaller and much more slender species. The following are the dimensions of Walker's type (a female):—Length 21 millim. (correctly given by Walker as "10 lines"); width of vertex 3 millim.; width of head 8 millim.; width of abdomen at base of third segment 9 millim.; length of wing 16 millim.

The head shows only a single flattened, deeply punctured, but ill-defined tubercle on each side, its base resting on the eye opposite the antennæ; there is no tubercle on the cheeks beneath the eyes, as in the specimen from Trinidad, which I have described as *C. funebris*; the dorsum of the thorax and scutellum seems originally to have been shining black; the "dark cinereous tomentum" mentioned by Walker is due to the dirty state of the typical specimen; pleuræ clothed with tufts of black pile, without a trace of yellow; dorsum and scutellum thinly clothed with shorter black pile; abdomen metallic dark violet, shining, the fourth and fifth segments more purple than the rest, the central portion of the third segment somewhat greenish blue; the sides of the segments below sprinkled with the usual irregular markings of greyish pollen, leaving rounded and irregular patches of the shining ground-colour; no trace of white margins to the segments above. Legs: femora reddish at the tips; tibiæ pollinose at the base; tarsi apparently not very broad; front tarsi, at any rate, scarcely more than half as broad as the corresponding pair in the typical specimen of *C. funebris*, the first joint longer, the remainder more compact and squarer. Wings somewhat narrow, uniformly brown, not paler at the base in front.

C. approximata, Walk., is distinguished from *C. funebris*, Austen, by its smaller size, more slender form, deeper violet colour of the abdomen, narrower tarsi, and the absence of a tubercle upon the cheeks.

The typical specimen, which is the only one in the collection, is from British Columbia (*J. K. Lord*); it is labelled in Walker's handwriting, and the description is attributed to

Walker in the list on p. 337 of vol. ii. of Lord's work ; van der Wulp is therefore in error in crediting the species to Smith (Biol. Centr.-Amer., Diptera, vol. ii. p. 2).

Through the kindness of Mr. O. Salvin I have had the privilege of examining the 'Biologia' specimens of *Cutiterebra*, and after a careful study of the two specimens which van der Wulp (*loc. cit.*) somewhat doubtfully assigns to *C. approximata*, Walk., I am able to say that neither of them belongs to this species. The specimen from Pinos Altos, Mexico, should apparently be referred to *C. terrisona*, Walk., while that from San Geronimo, Guatemala, seems to me to be a male of *C. americana*, F.

Prof. Brauer ('Monographie,' &c. p. 222) states that the eggs of *Cutiterebra* are unknown, and he is inclined to think, on account of the structure of the abdomen of the female, that the flies may be viviparous. However, I found an egg protruding from the ovipositor of the type of *C. approximata*, and also discovered an egg adhering to the type of *C. terrisona*, Walk. The egg of *C. approximata* is about $1\frac{1}{3}$ millim. in length, and is yellowish white in colour ; but with the exception of a longitudinal groove, doubtless due to drying, it appears to present no peculiarities.

Cutiterebra terrisona, Walk.
(Pl. XIII. figs. 2, 2 a.)

Cuterebra terrisona, Walker, List Dipt. Ins. in Coll. British Museum, iii. p. 683 (1849).

The typical specimen (the only one in the collection) is a female from Guatemala (*Sallé*). Dimensions:—Length $23\frac{1}{3}$ millim. (correctly stated by Walker as 11 lines) ; width of vertex $3\frac{2}{3}$ millim. ; width of head 9 millim. ; width of abdomen at base of third segment $10\frac{2}{3}$ millim. ; length of wing $18\frac{1}{2}$ millim.

There are five triangular spots of yellow pollen resting on the inner margin of each eye ; the three uppermost spots are small, the other two much larger ; the lowest, which rests on the inferior angle of the eye, is somewhat more quadrangular than the rest, while the spot above this is much the longest and extends to a point midway between the eye and the tip of the oral cleft ; the extremity of the vertical fissura frontalis on each side is also surrounded with an oval spot of yellow pollen ; the antennary pit is greyish and the occiput yellowish pollinose ; the head is entirely clothed with black hair, and there is no jagged band of yellow pollen on the posterior border of the cheeks below ; *thorax, except a narrow oblique*

tuft of yellow pile on the pleuræ in front of the base of the wings, entirely clothed with black hair: abdomen shining plum-purple*, the anterior margins of the third and fourth segments narrowly yellowish pollinose; in the case of the third segment there is an expansion of this narrow band on each side, so as to include the posterior margin of the preceding segment, and there are indications that the band at the base of the fourth segment is similarly expanded at the sides; the sides of the first four segments below and the whole upper surface of the fifth sprinkled with the usual irregular markings of yellowish pollen, leaving connected or isolated dots of the shining ground-colour. *Legs*: tarsi large and broad; last two pairs of femora with a patch of yellowish pollen at the base in front. *Wings* broader than in *C. americana*, F., $7\frac{1}{2}$ millim. in width at their broadest part, somewhat paler towards the base on the inner side.

Prof. Brauer ('Monographie,' &c. p. 245) states that he regards *C. terrisona* as a synonym of *C. americana*, F., and that he cannot understand how Walker could separate it; on this account Walker's species is definitely referred to *C. americana* by van der Wulp (Biol. Centr.-Amer., Diptera, vol. ii. p. 1). *C. terrisona* is, however, a perfectly good species, which can at once be distinguished from *C. americana* by the pleuræ being entirely clothed with black pile, except the small fleck of yellow hair, and by the absence of the jagged yellow pollinose border to the cheeks in the female.

Cutiterebra americana, F.

Cuterebra americana, Fabricius, Syst. Ent. 774, 6 (nec Walker, List Dipt. &c. iii. p. 683).

Two specimens, both females—one labelled "Georgia," the other without a locality. In his description Fabricius writes, "thoracis lateribus canis:" in these specimens the pleuræ are clothed with cadmium-yellow pile, but herein they agree with Prof. Brauer's description of the species ('Monographie,' &c. pp. 243–244) and also perfectly with Bracy Clark's coloured figure of his species *C. cauterium* ('An Essay on the Bots of Horses and other Animals,' London, 1815, p. 70, pl. ii. fig. 28), which is regarded by Brauer as a synonym of *C. americana*, F. The colour of the pile clothing the pleuræ is probably variable. In these specimens the contrast between the yellow pleuræ and black dorsum is very sharp, and with the polished deep purple abdomen and uniformly deep brown wings renders the species a strikingly

* Ridgway, 'Nomenclature of Colours,' pl. viii.

handsome one. The dimensions of the specimen from Georgia are as follows:—Length 23 millim.; width of vertex $3\frac{2}{3}$ millim.; width of head $9\frac{1}{3}$ millim.; width of abdomen at base of third segment $10\frac{2}{3}$ millim.; length of wing 18 millim.; greatest width of wing 6 millim.

Cutiterebra buccata, F.

Cuterebra buccata, Fabricius, Genera Insectorum, p. 305, 1776 (1777 ?), = *C. horripilum*, Walker (nec Clark), List Dipt. &c. iii. p. 683.

Two specimens, both males—one from Nova Scotia (*Redman*), the other with no locality. Prof. Brauer ('*Monographie*,' &c. pp. 249–250) does not mention that the outside of the anterior femora is thickly clothed with whitish hair.

Cutiterebra fontinella, Clark.

Cuterebra fontinella, Clark, Trans. Linn. Soc. xv. pp. 410–411 (1827), = *C. americana*, Walker (nec Fabricius), List Dipt. &c. iii. p. 683.

Three female specimens—two from Nova Scotia (*Redman*), the third presented by the Entomological Club, without a locality. These specimens have certainly nothing whatever to do with *C. americana*, F., but I refer them somewhat doubtfully to *C. fontinella*, Clk., since this species is stated by the author to have the last *two* segments of the abdomen white, whereas in the present specimens only the fifth segment is of that colour. In size, however, and other respects they agree very well with Clark's description, and *fontinella* is the only species given by Prof. Brauer in his table ('*Monographie*,' &c. pp. 229–230) to which it is possible to assign them. In '*Insect Life*,' vol. v. p. 319 (1893), Townsend describes two female specimens which he assigns to *C. fontinella* and which were bred from larvæ obtained near Doña Ana, New Mexico, "taken from *Lepus artemisia* (?), the common cottontail of the lower Rio Grande region in New Mexico." Townsend states that his specimens are "without doubt *Cuterebra fontinella*, Clark;" but the correctness of the identification seems to me to be very questionable. Clark mentions that *C. fontinella* is half the size of *C. cuniculi*, Clk., which he states to be as large as *Bombus terrestris*; but Townsend gives the length of his specimens as "20·5 millim. to 21 millim.," while he adds that a third specimen received from Colorado, which he also regards as belonging to this species, is "22 millim. in length." Townsend's specimens therefore must be nearly as large as *C. cuniculi* itself. Clark calls *C. fontinella* the "White-tailed *Cuterebra*,

or Blue Rabbit Fly," and the former of these names would seem to imply that the white tip to the abdomen is a conspicuous feature; but in the case of the two specimens bred by Townsend it was not until the colour of the abdomen was restored with chloroform that a "greyish bloom," clothing the inferior lateral edges of the segments, was observed "to extend in both specimens upon sides of abdomen and dorsum of last two segments, or even in places on dorsum of second segment." With reference to the specimen from Colorado, Townsend writes:—"The dorsum only of segments 1 to 3 of abdomen is narrowly purplish black, the side of the abdomen and all of last segment being covered with the whitish bloom and circular purplish-black spots." Clark's description of the abdomen, however, runs as follows:—"Abdomen breve, atrum, lucidum, supernè violaceo resplendens: segmentis duobus postremis hirtis, albidis, punctisque variis atris elevatis, glabris." I take this to mean that the white segments are more hairy than the rest, and clothed with pale pile; Townsend, however, says nothing about this, though, on the other hand, he states that the yellowish-white hairs clothing the pleuræ are "continued completely around edge of scutellum," which is not mentioned by Clark. Our specimens have the scutellum entirely clothed with black hairs, the first four segments of the abdomen shining violet-purple, clothed with short black pile, the fifth entirely covered with whitish-yellow pollen, sprinkled, especially at the sides, with small round shining dots of the ground-colour, and fairly thickly clothed with short pale golden-yellowish pile. It is therefore evident that, whether I am correct in assigning these specimens to *C. fontinella*, Clk., or not, they certainly cannot belong to the same species as Townsend's specimens. Except that only the last segment of the abdomen is whitish yellow, our specimens agree very well with Clark's description so far as it goes. The front shows two small triangular flecks of silvery-white pollen, resting on the eye on each side, which are not mentioned by Clark, and there is a similar fleck on the occipital margin on each side of the ocellar tubercle. The whole of the face and cheeks is covered with yellowish-white pollen and clothed with pile of a similar colour. In addition to the round shining spot on each cheek mentioned by Clark there is a similar but smaller one resting on the lower margin of the eye. The antennary pit is greyish, the lower margin on each side shining black, and the vertical fissura frontalis terminates on each side below in the usual dull black triangular mark. The antennæ are dark brown or

reddish brown, the third joint stout, rather longer than the first two joints taken together. The dorsum of the thorax greyish black, shining, clothed with short black pile; the pleuræ clothed with longer yellowish-white pile, which terminates above the base of the wing in front of the posterior tubercle. Of the three black spots on the pleuræ, arranged in a triangle, the upper one, which consists in a tuft of black pile, is in one specimen almost obsolete. Legs shining dark reddish brown, entirely clothed with black pile. Dimensions: length 16 millim.; width of vertex 3 millim.; width of head 7 millim.; width of abdomen at base of third segment $7\frac{1}{2}$ –8 millim.; length of wing 13 millim.

These specimens are much smaller than any other species of *Cutiterebra* in the collection, and their size and the white tip to the abdomen give them a very distinctive appearance. One specimen has three yellowish eggs adhering to the right hind tarsus.

Cutiterebra analis, Mcq. (= *C. apicalis*, Guér.).

Cuterebra analis, Macquart, Diptères Exotiques, ii. 3, pp. 22–23, tab. ii. fig. 5 (1843).

Cuterebra apicalis, Guérin-Ménéville, Iconographie du Règne Animal, Insectes, pp. 547–548 (1844), and pl. ci. fig. 1 &c. (1835).

Two specimens, male and female—the former from Orizaba, Mexico (*Sallé*), the latter from Tunantins, R. Amazons, Brazil (*Bates*). The male has a fleck of black pile on the humeral tubercles in addition to those on the pleuræ.

Guérin-Ménéville's excellent coloured figure leaves no doubt of the synonymy above given. Macquart's figure, on the other hand, is execrable; but his description is much more detailed than that of Guérin-Ménéville. It is clear from internal evidence (the date 1844 is quoted on p. 531 and "mars 1844" on p. 553) that the *description* of *C. apicalis* was not published until 1844, although the date on the title-page of the portion of the 'Iconographie' which contains the Insects would lead the reader to suppose that it appeared in 1838. The particular plate on which the figure of *C. apicalis* is given is, like certain other of Guérin-Ménéville's plates, not dated; but since the plates immediately preceding and following it bear the date "8^{bre} 1835," we may safely conclude that pl. ci. was published at the same time. On the whole, however, it seems better to adhere to the principle that a figure of a species unaccompanied by a description does not constitute publication.

Cutiterebra rufiventris, Macq.
(Pl. XIII. figs. 3, 3 a.)

Cutiterebra rufiventris, Macquart, Diptères Exotiques, ii. 3, pp. 21-22 (1843); Brauer, Monographie der Oestriden, pp. 245-246 (1863).

A female specimen from Ecuador, collected by Mr. Clarence Buckley, undoubtedly belongs to this species, which was described from a single male from the neighbourhood of Pará (Brazil): Brauer merely translates Macquart's description without having seen a specimen. I therefore append a description of this female.

♀. Length $23\frac{1}{2}$ millim. (rather more than that of Macquart's type, which he states as 9 l. (French), = 20 millim.); width of vertex $3\frac{2}{3}$ millim.; width of head $9\frac{1}{3}$ millim.; width of thorax at base of wings 9 millim.; length of thorax including scutellum $11\frac{1}{2}$ millim.; width of abdomen (second segment) $11\frac{1}{2}$ millim.

Margins of the *front* next the eyes below bordered with yellowish pollen, which on each side runs out inwards in two triangular projections, enclosing the uppermost "espace arrondi luisant" of Macquart; the lower of these triangular projections extends to the *fissura frontalis*; the bare spots on the *face* large and very conspicuous when the head is viewed from in front. *Thorax* greyish black; *scutellum* reddish brown, darker at the sides, semitranslucent by transmitted light, flattened, and somewhat acuminate, yellowish pollinose below; a strongly marked brownish-black median stripe extending from the anterior margin of the thorax to the middle of the scutellum, about 2 millim. broad in front, and tapering somewhat posteriorly; on each side of this a light grey stripe of about half its width, and, contrary to the statement of Macquart, extending to a distance of 2 millim. beyond the suture; outside the grey stripe a black one on each side running to the scutellum, somewhat broader than the grey stripe in front, but extremely attenuated behind the suture; the greyish area outside the last-mentioned stripe on each side somewhat indistinctly divided by a broader black stripe, which joins the inner margins of the tubercles on the anterior and posterior angles: pectus and pleuræ greyish pollinose, two small dark brown shining spots, of which the posterior is the more elongated and duller, on the pleuræ below the spots of black pile noticed by Macquart; the yellow pile clothing the pleuræ and pectus forming a narrow fringe, which limits the dorsum and extends to the posterior tubercle above the base of the wing; dorsum and upper surface of scutellum clothed with short black pile, becoming more conspicuous

where it meets the yellow fringe; a few short yellowish hairs projecting from the under surface of the scutellum posteriorly. *Abdomen* reddish chestnut, the sides of the last three segments below, as well as more or less of the anterior portion of the third, greyish pollinose; the first four segments thickly clothed with short, appressed, silky hairs of a ferruginous hue; the fifth segment thickly clothed with longer golden hairs; the second segment with an oblong patch of black hairs on each side, occupying only the anterior two-thirds of the segment, and not descending far down the sides; it is probably to these patches that Macquart is referring when he states, "premier segment noir, à bord postérieur fauve;" a triangular area in the centre of the second segment also clothed with short black pile, reaching to the posterior margin in the median line, and surrounded on each side by a tuft of longer yellowish-orange pile starting from the posterior margin of the first segment; central portion of third segment near the posterior margin with an ill-defined black band, due to short black hairs mingling with the ferruginous ones; posterior margin of second and third segments narrowly whitish. *Legs*: first two pairs of *coxæ* black, greyish pollinose, the anterior pair clothed externally with pale yellow hairs and in front with black hairs, the middle pair clothed externally with yellow hairs, mingled with which are a few black ones; posterior *coxæ* black, reddish brown behind, clothed externally with a tuft of yellow pile and at the extreme base with black hairs; *femora*, *tibiæ*, and *tarsi* brownish black, clothed with black hairs; the anterior femora and the posterior side of the others at the base reddish brown; the bases of the femora, posteriorly in the case of the first two pairs and anteriorly in that of the the last pair, yellowish pollinose and clothed with yellow pile; bases of the middle femora also with traces of yellow pollen above and anteriorly, those of the last pair posteriorly slightly yellowish pollinose and with a few yellow hairs. *Wings*, *alulæ*, and *squamæ* very dark brown, the latter with a fine border of extremely short yellowish pile; *wings* not very large for the size of the insect, covered with conspicuous transverse wrinkles; *alulæ* large, subquadrate in shape, strongly wrinkled, and very conspicuous when the insect is viewed from the side with the wings at rest.

Ecuador (*Clarence Buckley*); one specimen.

Cutiterebra nigricincta, sp. n.

(Pl. XIII. figs. 4, 4 a.)

♂. Length $19\frac{1}{2}$ millim.; width of vertex 3 millim.; width

of head 8 millim.; width of thorax at base of wings $8\frac{3}{4}$ millim.; width of abdomen (second segment) 10 millim.; length of wing $16\frac{1}{2}$ millim.

Black; dorsum of the thorax, except a small area on the anterior margin, clothed with black pile; central portion of the pleuræ also clothed with black pile; abdomen metallic brassy green, shining, thickly clothed with silky golden-yellow pile, with a conspicuous band of black pile on the posterior margin of the third segment, the base also clothed with black pile.

Head entirely clothed with shimmering pale golden pollen, thinly covered with short pile of the same colour, which is longer and thicker on the cheeks below and nearly conceals the oral cleft; occipital margin of the vertex brownish, with a blackish-brown triangular mark enclosing the upper angle of each eye, and bearing a few short black hairs; ocellar tubercle also with a few black hairs; *antennary pit* greyish pollinose; *antennæ* dark brown, first and second joints clothed with pale golden pile above, third joint ovate, about half as long again as the two former taken together; *arista* dark brown at the base, reddish brown towards the tip, cilia pale yellowish; *lunula frontalis* brownish black, shining; on each side of the face and touching the margin of the eye opposite the third joint of the antenna *a large shining black spot*, with the upper margin straight and bluntly conical below, sparsely punctuate and bearing a few pale golden hairs; the upper margins of these spots are on a level with the base of the third joint of the antenna; they are separated from the fissura frontalis by barely half their width; *a similar spot*, rather larger in size and subquadrate in shape, *on the cheeks* near the lower margin of each eye, and directly below the upper spot; a small bare triangular fleck between the lower spot and the eye, touching the lower margin of the latter. *Thorax*: anterior surface clothed with golden pile, which extends to a distance of 2 millim. as a semilunar patch on the anterior margin of the dorsum; this patch is scarcely visible when looked at from above, but conspicuous when the insect is viewed from in front; *scutellum* black and clothed with short black pile above, yellowish pollinose below, and with a few short yellowish hairs projecting from below the posterior margin; *pectus* clothed with deep yellow pile, which runs up on to the pleuræ in two stripes; the anterior of these, which is the broader, forms an arch over the prothoracic stigma and is in connexion with the yellow pile on the anterior surface, while the posterior stripe terminates in a tuft in front of the squamæ. *Abdomen*: first and second segments clothed with short black pile, sides

of the second segment below greyish pollinose and with a few short yellow hairs, a little yellow pile on the anterior angles of the first segment also; central portion of the third segment somewhat bluish, the band of black pile on the posterior margin very conspicuous and sharply defined when the insect is viewed obliquely from the front; this band does not reach the posterior angles of the segment below, while the ends are divided by a tapering band of greyish pollen, on which the pile is somewhat sparser, while in front of it there is a line of hair projecting at a different angle from the rest, so that on looking at the ventral surface we appear to see the margin of an additional segment; ground-colour of the fifth segment, when viewed from behind, tawny, with a dull greyish pollinose transverse band, divided in the median line and occupying rather more than the anterior half of the segment; this is most conspicuous when the specimen is held so that the eye looks directly at the edge of the hind margin of the fourth segment; in certain positions a narrower greyish pollinose band is also visible on the sides of the third and fourth segments, lying nearer to the anterior than to the posterior margin, but not in contact with either, and dying away on the dorsal surface before reaching the median line; a narrow dull median longitudinal stripe is faintly indicated when the abdomen is viewed obliquely from behind; the pile clothing the fifth segment thicker and longer than elsewhere. *Legs* clothed with black pile, the posterior surface of the last pair of femora thinly clothed nearly to the tip with short silky yellowish pile; all the coxæ, the bases of the anterior femora above, and those of the middle pair posteriorly also with some yellow pile; *femora* and *tibiæ* reddish brown, the latter darker than the former; *tarsi* black, short and broad; *claws* black. *Wings* brown, somewhat lighter towards the posterior margin, narrow and tapering to the tips, somewhat lancet-shaped; *alulæ* dark brown, of moderate size, subquadrate; *squamæ* dark brown, fringed with short brown pile, and showing no light margin.

Pará, Brazil (*Bates*); one specimen.

This species presents no resemblance to any of those previously described: it is at once distinguished from *Cutiterebra analis*, Macq. (*apicalis*, Guér.), by the thorax and scutellum (with the exception of the anterior margin of the former) being entirely clothed with black pile instead of with golden yellow; while the unstriped thorax and the shining metallic abdomen, with its black transverse band, render it impossible to confuse *C. nigricincta* with *C. rufiventris*, Macq.

BOGERIA, gen. nov.

Large, compact, and thick-set flies, resembling *Cutiterebra* in general appearance, but with the arista bare and the tarsi, or at least the front and middle pairs, not expanded.

Allied to *Rogenhoferia*, Brauer (Verh. k. k. z.-b. Ges. Wien, 1863, and 'Monographie der Oestriden,' 1863, pp. 215-216), but differing as follows:—*Profile of the head* much more nearly semicircular than that of *Rogenhoferia* as shown in Brauer's figure ('Monographie,' &c. tab. iv. fig. 8 a); viewed from in front the outline of the head much more nearly circular than that of *Rogenhoferia* as figured by Brauer ('Monographie,' &c. tab. vi. fig. 14); *eyes* occupying rather more than the upper half of the head in profile, but not projecting above the vertex—rather on a slightly lower level when viewed from in front; with the head in its natural position, no space visible between it and the thorax, when the insect is viewed from the side; *antennary pit* small, in length equal to about one fourth of the greatest length of the eyes, and, when the head is viewed from in front, extending from a point opposite the centre of the inner margin of the eye to another slightly lower than the middle of the lower half of the latter; *antennæ* small, first two joints very short, *third joint* rounded at the tip, *rather longer than the first two joints taken together*; *arista* short, stout, tapering only at the tip, first segment somewhat elongated and arising from the third joint of the antennæ at a point about one third of its length from the base; *proboscis* short, concealed in the oral cleft, at least in the typical species; *occipital orbits* very conspicuous; *first pair of legs* slender, the tarsi not expanded; middle and posterior legs, though stouter, with tarsi but slightly dilated, scarcely broader than the tibiæ, their middle joints ovate, not semilunar; *wings* shorter than in *Rogenhoferia*, tapering to their tips, with no appendix to the angle of the fourth vein; *alulae* large, quadrate, with the anterior angles rounded, very prominent when the wings are at rest; *abdomen* bluntly conical, the basal angles rounded off abruptly.

Pupa-case viewed from above subpyriform, much more regular in outline than that of *Cutiterebra*, since the segments bear no ridges as in the genus alluded to; viewed from the side, the under surface slightly concave, the upper strongly convex; upper surface of the first four segments forming a cap ("Deckel"), as in *Cutiterebra*, to facilitate the escape of the imago; terminal segment concealed in a narrow transverse slit, bearing a notch on the lower instead of the upper margin, as in *Cutiterebra*; the eighth segment the longest;

rather less than the anterior half of all the visible segments (the "cap" is wanting in the two specimens from which this description is taken) surrounded by a zone of small, sharp, backwardly directed *spines*, the largest of which are about 1 millim. in length; a narrow and less conspicuous ring of smaller spines surrounds the posterior margins of the segments; the rest of the surface covered with small, distinct, bluntly conical *tubercles*, *not scales*; the three lateral rows of protuberances exhibited by the pupa-case of *Cutiterebra* but very faintly indicated, and that only upon segments anterior to the seventh; posterior stigmata reniform.

The absence of transverse ridges upon the posterior region of the segments and the fact that the surface is covered with tubercles and spines* instead of with imbricated scales at once distinguish the pupa-case of *Bogeria* from that of *Cutiterebra*. The previous stages of *Rogenhoferia trigonophora*, Brauer ('Monographie,' &c. pp. 217-218), the type of its genus, are unknown; but, according to Berg's description (Stett. ent. Z., Jahrg. xxxvii. 1876, pp. 271-272) of the larva of *Rogenhoferia* (*Cephenomyia*) *grandis*, Guér., the only other species that has as yet been assigned to *Rogenhoferia*, the pupa-case in that genus also is covered with scales.

Bogeria can be inserted in Prof. Brauer's tables (*vide* 'Monographie der Oestriden,' p. 45, and Wien. ent. Z., Jahrg. vi. 1887, p. 15) as follows:—

Œstridæ.

CUTITEREBRINÆ.

I. Arista feathered above.

a. Tarsi broad, flattened *Cutiterebra*, Clk.

b. Tarsi slender *Dermatobia*, Brauer.

II. Arista bare.

a. Antennary pit large; third joint of the antennæ short, round, not longer than the second; arista

* The spiny larva described by Coquerel and Sallé (Ann. Soc. Ent. Fr. iv. sér. t. 2, 4^{ème} trim., 1863, p. 785, pl. xix. fig. 2) from *Lepus palustris*, Bachm., from Mexico, and assigned by the authors to an undetermined species of *Cutiterebra*, may possibly belong to this genus. In this case, however, the spines are apparently not arranged in definite zones, and, judging from the enlarged figure (pl. xix. fig. 2 b), they are shorter and broader than in *Bogeria*. The fact that some of them are bifid at the tip may be due to their being broken. Townsend ('Psyche,' vol. vi. 1892, pp. 299-300) describes a spiny larva, assigned by him to *Dermatobia*, sp., from *Lepus callotis*, Wagler, from New Mexico; but neither in this case are the spines arranged in zones. Townsend writes:—"Segments after the first sparsely covered with short, black, curved spines. . . ."

long, slender; alulæ of moderate size; wings with a short appendix to the angle of the fourth vein.....

Rogenhoferia, Brauer.

- b. Antennary pit small; third joint of the antennæ slightly longer than the first two joints taken together; arista short, stout; alulæ large; wings with no appendix to the angle of the fourth vein.....

Bogeria, nov.

I dedicate this genus to Lieut. H. O. Boger, R.N., to whom the British Museum is indebted for the specimens of the typical species described below.

Bogeria princeps, sp. n.
(Pl. XIII. figs. 5-5 b.)

♂. Length $20\frac{1}{2}$ - $21\frac{1}{2}$ millim.; width of front at vertex $2\frac{1}{2}$ -3 millim.; width of head $8\frac{1}{2}$ millim.; length of wing 16 millim.

General colour of thorax brownish grey, abdomen silvery grey; ground-colour reddish brown, concealed by greyish dust; thorax and abdomen nearly bare above; pleuræ clothed with thick white pile, which extends in a stripe above the base of the wing to the base of the scutellum.

Head almost precisely the same width as the thorax, the latter appearing slightly broader at the base of the wings, owing to the pilosity of the pleuræ; front thinly clothed below with short appressed yellowish-white hairs, and above and on the vertex with short erect blackish hairs, and forming a rounded projection in front of the eyes when the insect is viewed from above; a narrow median shining black triangle extending forwards from the anterior ocellus to a distance of $1\frac{1}{2}$ millim.; a strongly marked ridge surrounding the antennary pit, except below, and bounded by the vertical semi-circular fissura frontalis; antennary pit contracted below into a narrow flattened median ridge extending to the oral cleft; septum separating the antennæ well marked: *antennæ* blackish brown, second joint reddish brown; arista bright reddish brown; first joint and extreme base of the second black; a shining dark brown semilunar spot above the base of each antenna, while, on a slightly lower level, a transversely elongated shining spot of a similar colour extends upwards and inwards from the margin of each eye; above each of the latter spots a small silvery-white triangle, resting on the margin of the eye: *face and cheeks silvery white*; face covered

with somewhat coarse closely-set punctures, which become smaller below and are absent on the cheeks below the eyes; face and cheeks clothed with silvery-white pile, which is very sparse on the former, but thicker on the latter, and partially conceals the oral cleft; a curved shining black mark on each side of the antennary pit below, continued backwards as a narrow incised line on each side of the contracted portion, and ending in a small triangular shining spot on each side of the commencement of the wider portion of the oral cleft; between each of these spots and the eye, and nearer the latter, a conspicuous, sharply defined, and somewhat rounder shining spot, while in the same straight line and close to the orbit lies a much smaller and less distinct fleck, above which and halfway between it and the transverse shining spot already mentioned is a similar mark; the extremity of the vertical arc of the fissura frontalis on each side dull black; occiput clothed with silvery-white pile; occipital orbits silvery white.

Thorax and scutellum thinly clothed above with short black pile, which becomes more conspicuous and forms a distinct longitudinal stripe above the thick white pile of the pleuræ; pectus also clothed with thick white pile; posterior border of the *scutellum* thinly clothed beneath with whitish pile, which projects beyond the margin, and so gives the scutellum a whitish rim.

Abdomen coarsely granular above; posterior border of third, fourth, and fifth segments and that of the second on the sides narrowly shining black; upper surface thinly clothed with short black hairs; basal angles in the typical specimen clothed with longer silvery-white pile, in front of which is a little black pile, while the basal angles are connected by a semilunar band of silvery-white pile, which conceals the hind margin of the second segment, and in the median line projects on to the third segment, which is clothed in the centre behind this projection with brownish pile; in the other specimen the longer pile on the second segment is for the most part brownish, a little paler and thinner in the middle of the hind margin, while there is more black pile on the sides of the segment in front; ventral groove thickly clothed with whitish pile, except in the median line; sides of the segments below thinly clothed with short silvery pile; genital ring a broad quadrangular plate.

Legs: *coxae* shining black, pollinose, clothed with whitish pile, the posterior pair also with black hairs; *femora* reddish brown, pollinose, apices black, extreme tips shining, clothed above and below with whitish pile, while the second and third also bear a certain number of black hairs on the inner side at

the base and above; tibiæ and tarsi black, greyish pollinose, the former thinly clothed, the latter fringed at the sides with black hairs; claws black, sometimes reddish brown in the middle.

Wings uniformly light brown; *alulæ* and *squamæ* also brown, the margin of the latter paler and fringed with very short silvery pile; *alulæ* very conspicuous when the wings are at rest, directed upwards, and embracing the scutellum on each side.

Pupa-case black: length 25–26 millim.; width of seventh segment (the broadest) 15 millim.; posterior stigmata orange-yellow.

Médano Blanco, Sta. Barbara Bay (Gulf of California), Mexico (*Lieut. H. O. Boger, R.N.*); two specimens, both males, with their pupa-cases. The pupæ, from which the specimens subsequently emerged, were found in January 1893, when Lieut. Boger was serving on the Pacific station in H.M.S. 'Melpomene.' The flies appeared in the following March.

To the anal extremity of each of the pupa-cases are still adhering a number of hairs, evidently those of the host; they are pale yellowish brown, somewhat curling, and one of them has a distinct black tip. They probably belong to some Rodent, but I fear are not sufficient to enable one to hazard even a guess at the host's identity. Lieut. Boger, however, informs me that jack-rabbits (*Lepus callotis*, Wagler) were abundant in the locality where the larvæ were found.

DERMATOBIA, Brauer.

Dermatobia, Brauer, Verh. z.-b. Ges. Wien, 1860; 'Monographie,' &c. 1863, pp. 251–253. ♀

Dermatobia cyaniventris, Macq. (= *D. noxialis*, Goudot).

Cuterebra cyaniventris, Macquart, Diptères Exotiques, ii. 3, p. 23 (1843).

Cuterebra noxialis, Goudot, Ann. des Sc. Nat. 3^e sér. t. iii. pp. 229, 230 (1845).

One female, from Ega, R. Amazons, Brazil (*Bates*).

In spite of the fact that, as pointed out by Goudot (*loc. cit.* p. 230), Macquart does not mention that the abdomen of *C. cyaniventris* is clothed with short black pile, with whitish (yellowish) pile at the base, there can be no doubt that the descriptions of the two authors refer to the same species. The species is redescribed by Brauer ('Monographie,' &c. pp. 267–268) from a specimen in the Imperial Natural History Museum at Vienna.

In addition to the specimen mentioned above, the Museum also possesses two larvæ of *Dermatobia*, both of which are probably in the second stage, and belong to the form known in Cayenne as the "Ver macaque," although one is considerably smaller and more attenuated than the other. *D. cyaniventris* is the only species at present described; but whether either or both of these larvæ belong to this species or to some other it is, of course, impossible to say. The smaller larva, which was removed from the arm of Mr. E. Bartlett in Chamicuros, E. Peru, in 1867, is 15 millim. in length, of which the more swollen portion, consisting of the first seven segments bearing the usual bands of spines, occupies less than one third. The width of this larva at the sixth segment (the widest part of the swollen portion) is $2\frac{1}{2}$ millim., while the width in the centre of the attenuated portion is only 1 millim. The second larva is from Trinidad, and was forwarded by Mr. J. H. Hart at the same time as the typical specimen of *Cutiterebra funebris*, Austen. This larva was removed from a human knee at the commencement of December 1894. In his letter accompanying it Mr. Hart writes:—"From frequent cases I think it highly probable that we have several species of this kind of insect in the colony." This, however, remains to be seen; there may be several species of *Dermatobia* in Trinidad, but it is quite possible that Mr. Hart is referring to different stages of the larva of the same insect. The dimensions of this larva are as follows:—Length $9\frac{1}{2}$ millim.; length of swollen portion 7 millim.; greatest width about 4 millim.; width of attenuated portion $1\frac{1}{3}$ millim. Although about twice the length, in the ratio of the attenuated to the swollen portion of the body, this larva closely resembles that described and figured by Dr. Matas ('Insect Life,' i. pp. 76–80, fig. 10), which, with two others, was removed by the author referred to, in the Charity Hospital, New Orleans, from the body of an Englishman who had recently come from Spanish Honduras.

EXPLANATION OF PLATE XIII.

- Fig. 1. *Cutiterebra funebris*.
 Fig. 1 a. Ditto. Head from in front.
 Fig. 1 b. Ditto. Pupa-case.
 Fig. 2. *Cutiterebra terrisona*, Walk.
 Fig. 2 a. Ditto. Head from in front.
 Fig. 3. *Cutiterebra rufiventris*, Macq., ♀.
 Fig. 3 a. Ditto. Head from in front.
 Fig. 4. *Cutiterebra nigricincta*.
 Fig. 4 a. Ditto. Head from in front.
 Fig. 5. *Bogeria princeps*.
 Fig. 5 a. Ditto. Head from in front.
 Fig. 5 b. Ditto. Pupa-case.